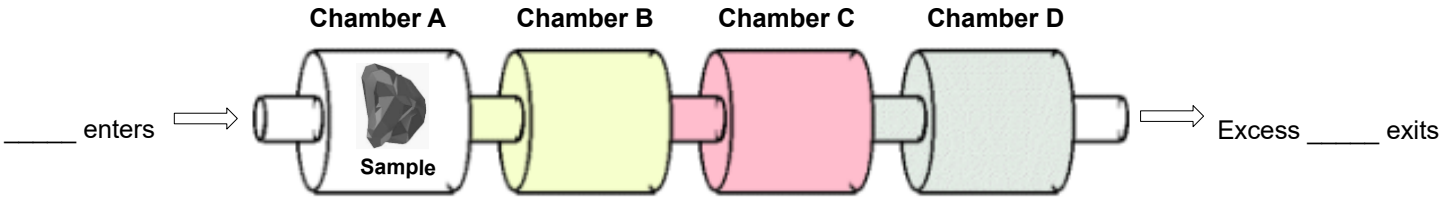
CONCEPT: COMBUSTION APPARATUS

- **Combustion Apparatus**: where the sample is vaporized and goes through combustion by traveling between chambers.



□ **Chamber A**: Place where the sample is first vaporized.

□ **Chamber B**: Place where hydrogen is converted into H_2O and the nonmetal is converted into a gas.

□ **Chamber C**: Place where the water is trapped.

□ **Chamber D**: Place where the gas is trapped.

EXAMPLE: The compound that makes up an experimental jet fuel contains C, H and O. Suppose that in one experiment the combustion of 11.5 g of the liquid gave the following results:

Mass of CO_2 absorber **before combustion** = 10.815 g
Mass of CO_2 absorber **after combustion** = 32.815 g

Mass of H_2O absorber **before combustion** = 10.110 g
Mass of H_2O absorber **after combustion** = 23.610 g

Find the empirical formula of the unknown liquid.

STEP 0: Subtract the grams after combustion by the grams before combustion to find the grams of CO_2 and H_2O.

STEP 1: Convert the grams of CO_2 to grams of _____.

STEP 2: Convert the grams of H_2O to grams of _____.

STEP 3: If necessary, subtract the grams of **STEPS 1** & **2** from the grams of the sample to determine the 3rd element.

STEP 4: Convert all the masses into _____.

STEP 5: Divide each mole answer by the smallest mole value in order to obtain whole numbers for each element.

STEP 6: If you get a value of _____ or _____ then you can round to the nearest whole number.

□ If you can't round we multiply by a factor to create whole numbers.

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PRACTICE: The following results are obtained from burning 5 g of an organic molecule (MW = 233.07 g/mol), which contains C, H, and O, in a combustion chamber:

	Before combustion	After combustion
Mass of CO_2 absorber	75.30 g	78.15 g
Mass of H_2O absorber	49.14 g	50.11 g

Determine the molecular formula.

a) $C_9H_{15}O$

b) $C_3H_5O_{12}$

c) C_6H_5O

d) $C_{18}H_{45}O_3$